Framework for Restoration Planning and Priority-Setting

This chapter of *A National Strategy* provides a framework for planning and setting priorities for coastal and estuarine habitat restoration. It provides restoration program planners and practitioners with information to support comprehensive and inclusive planning to identify restoration needs and opportunities on the watershed, estuary and regional level. Information also is provided to design scientifically sound restoration projects, help establish restoration priorities and implement plans and select projects that contribute to the goals of estuary or regional plans. It is hoped that the outcome of applying this information will be an increase in the quality and quantity of habitat restoration.

Addressing historical habitat degradation and losses requires that difficult choices be made. Although the science of restoration has developed to be able to successfully restore many habitats and there is tremendous capability and interest in doing so, there currently is not enough funding available to restore function to all degraded habitats identified for restoration. This framework is intended to help identify restoration needs and to develop consensus on what restoration actions would be most beneficial on estuary, regional and larger scales. Providing similar information and analyses for all estuaries and regions will streamline and advance the process of setting priorities by allowing comparisons to be based on best available local information.

PART I: FRAMEWORK FOR ESTUARY- AND REGIONAL-SCALE PLANNING

Habitat restoration is undertaken by a wide variety of groups, from all levels of government to members of the private sector, including corporations and nonprofit organizations. While the recent broad interest and involvement in restoration is a positive development, the outcome can be greatly improved if projects are coordinated and not conducted in isolation. Implementing a comprehensive plan based on restoration needs, benefits and opportunities can reverse patterns of system-wide habitat loss or degradation and provide opportunities for leveraging resources. By establishing goals and priorities for restoration within estuary and regional restoration plans, planners can direct funding for restoration projects toward the most important needs.

Several factors have been identified that result in effective restoration plans. Effective restoration planning occurs over the largest appropriate scale (over several state boundaries if it is ecologically appropriate); considers and is consistent with other efforts to protect habitat; considers the restoration and protection goals of coastal zone management plans; includes diverse stakeholders as part of an open, public process; and is considered part of an iterative process.

The steps in planning restoration at the estuary or regional scale include evaluating conditions in the estuary or region; using the current status, historical conditions, and opportunities for restoration to identify priority areas and habitats; establishing realistic and measurable goals for restoration; and documenting this information in a restoration plan.

EVALUATING THE WATERSHED OR ESTUARY

Evaluating a Watershed or Estuary

- ❖ Evaluate current status of habitat
- ❖ Describe causes and rates of decline in habitats
- ❖ Identify services provided by habitat—ecological, social and economic
- ❖ Evaluate opportunities to restore habitats in the system

Evaluating the watershed or estuary will provide information to allow planners to establish restoration priorities in terms of which habitat types to restore, and which areas should be restored first. The current status of habitat provides a baseline for future analysis and measurement, and a comparison of current conditions with past habitat distributions allows an evaluation of the severity of potential threats. Knowing the causes of habitat degradation and loss helps determine whether habitat can be protected and restored. The benefits currently and previously provided by habitat will determine the anticipated benefits of restoration actions. Finally, assessing opportunities for habitat restoration will help determine whether habitat restoration can realistically be accomplished.

Current Status of Habitat

Understanding the current distribution, function and condition of habitats will allow planners to identify habitats and areas

that are under intense threat of degradation or loss. Habitat and land use maps provide information to assess the current state of resources and can provide a foundation for predicting future loss. Providing a synthesis of available data on habitat distribution and its use by important species for feeding, refuge and reproduction will help define scarce habitats and provide a starting place to assess the functions various habitats serve.

Causes and Rates of Decline

An estimate of historical or baseline conditions is needed to determine rates of loss, evaluate threats and predict future trends for various habitat types and areas within the system. Although loss rates are more difficult to assess than the current status of habitat, they are necessary to identify critical habitats within a system. The availability of historical information varies greatly from place to place. For some estuarine systems, historical maps with reliable habitat information that goes back decades, along with anecdotal information on previous centuries, may be available. For other systems, only limited anecdotal information may be available.

Some habitat losses are easy to identify because they occur in highly visible areas or because changes are dramatic. Long-term or more gradual change can be just as damaging to the function of the ecosystem, but may be more difficult to track. Common habitat types may be undergoing rapid loss or degradation, while less common habitats might be stable. By identifying loss rates, the common habitat could be identified as a higher priority for restoration. Where limited historical information exists, best professional judgment will need to be applied and more emphasis will have to be placed on benefits that the habitat provides.

Compiling information on likely causes of habitat decline or loss will help identify restoration priorities. The threat of future losses or degradation due to changing land use patterns or other causes might make a certain habitat a higher priority for restoration, or identify factors that must be controlled before restoration could be successful. For example, the major cause of decline of seagrass beds might be nutrient enrichment. Without a plan in place to control nutrient runoff, efforts to restore seagrass beds could be ineffective.

Services Provided by Habitat

Documenting the functions and services provided by habitat types within the estuary is important for identifying restoration priorities. Both ecological needs (functions and services provided to the ecosystem) and human needs (social and economic) must be considered. To develop support for restoration planning, the approach to developing a list of important ecological needs and functions should include a broad cross-section of interests. Habitats that sustain remaining populations of endangered species can be defined as critical, as can habitats experiencing a particularly rapid loss rate, and those that have been significantly depleted over time. Habitat that provides important biological functions and services, such as foraging, spawning and nursery areas, should be considered critical. The presence of keystone species or other indicators of healthy habitat function should also be identified and included in the evaluation of priorities based on potential benefits for natural resources.

It also is important to consider the restoration of an estuary or watershed within the economic and social context of nearby communities. The economies of coastal cities and towns are linked to their ports and fishing fleets, as well as tourism and other forms of recreation. When identifying critical habitats and resources within a system, exploitable resources such as shellfish beds should be considered, as should habitat for commercial, recreational and subsistence fisheries species. Potential conflicts and impediments to restoring valuable species and habitats should be identified early in the planning process.

Opportunities to Restore Habitat

Identifying opportunities for restoration also will be useful in setting priorities. Where factors such as land ownership, development patterns and ongoing restoration activities are favorable, it may be easier to restore habitat. For example, degraded habitat that is publicly owned or owned by a corporation receptive to restoration goals may provide an opportunity to take actions to benefit the ecosystem. Abandoned industrial facilities present opportunities to improve habitat or increase public access to the shoreline as the properties are redeveloped. Considering habitat needs in the context of opportunities for restoration will improve chances for successful restoration.

ESTABLISHING PRIORITIES FOR THE WATERSHED OR ESTUARY

Establishing Restoration Priorities
1. Severity of need (scarceness of habitat and threat to species or habitat)
2. Ecological benefits provided by the habitat or species
3. Chances of successfully restoring the habitat or species
4. Public support for restoration of the habitat or species
5. Social and economic benefits provided by the habitat or species

Establishing priorities for restoration requires an evaluation of the greatest habitat needs based on severity of past losses, expected benefits, chances of success and public support. Identifying current habitat distributions and the services they provide allows for definition of habitats that could be expanded or improved, and determination of benefits that would accrue if habitat were restored. Historical information, causes of decline and opportunities for restoration provide information on what might be possible to achieve (if surrounding land use does not prohibit returning to former habitat patterns) and can provide information about the components of an intact ecosystem. Priorities should be expressed in terms of specific habitat types to be restored and priority areas for restoration. Using the information developed in the evaluation of the watershed or estuary, these priorities should be ranked according to need and a realistic assessment of the probability of restoring the desired function.

To help identify realistic restoration goals for the estuary, benefits of restoration activities must be balanced against factors that influence the chances of success of restoration. Restoration of the biodiversity and functional ecology of the area must be attempted within the context of the needs of the multiple users of the system. Undisturbed areas of estuaries support tourism and/or provide aesthetic and cultural benefits to both local communities and society as a whole. In these areas it is relatively easy to restore habitat to support native wildlife, including endangered or threatened species, migratory birds and resident species of the estuary. In some areas, the dominant service provided to society might be to support economically important harvest or culture of estuarine-dependent species. Restoration of these functions would be more feasible in less disturbed parts of the estuary. In industrial, commercial and urban portions of estuaries, navigation, marine transportation, industry and commercial activity might be the dominant uses of the environment. The ecosystem functions of such areas are often severely degraded and subjected to pressures and stresses from urban runoff, wastewater, physical disturbance associated with dredging or marine traffic and direct recreational pressures. In these areas, restoring complete natural habitat functions would be more challenging. Regardless of the degree of alteration, it is important to establish a realistic vision of the conditions of restored habitat. When realistic goals are established, it is possible to restore highly altered systems to contribute to ecosystem function.

Although degraded areas might be more difficult to restore, in some instances, the benefits of restoring degraded habitat might be greater than restoring more pristine environments. Restoring even a relatively small area of severely degraded

habitat may contribute significantly to ecosystem health. For example, fish may need to pass through more urbanized downstream areas to reach upstream spawning habitat. Therefore, restoring a portion of the urbanized watershed might provide valuable refuge needed to ensure the survival of the species, while also benefiting estuarine function.

Surrounding land use and other conditions of the landscape must be considered in terms of implications for restoration success as well as for the benefits provided by restoration activities. If the area is subsiding, restoration may not be successful unless processes that compensate for the subsidence are set in place. The presence of impermeable surfaces, altered or hardened shorelines, dikes or tide gates will affect the chances for successful restoration. If contaminant sources are not controlled, restoration may not be successful. It is essential to ensure that the problems of the past will not threaten the restored system, and to continue to develop new approaches to solving ongoing restoration challenges.

Scarceness of habitat, benefits provided by the habitat and chances for successful restoration should be considered in a public forum to identify those watershed or estuary restoration priorities that will have broad public support. The priorities should specify habitat types to be restored and priority areas for restoration within the estuary or watershed.

ESTABLISHING RESTORATION GOALS

Once priority habitat types and areas have been identified, measurable goals for restoration should be selected. Measurable standards with realistic expectations should be identified that clearly outline the problems that the restoration plan is attempting to address. Where possible, spatial and temporal scales should be identified. For example, the Chesapeake 2000 plan includes a goal to increase, by 2010, native oyster populations in the Chesapeake Bay to ten times the 1994 population levels.

The process of establishing restoration goals should be closely linked to the resource evaluation and prioritization process. This allows the multiple stakeholders within a region to consider the critical resources and patterns of loss for a system and to develop a course of action in which they can make optimal use of opportunities and leverage resources to maximize the benefits of their restoration efforts. It is critical to this process for a broad spectrum of stakeholders to be involved in goal setting. Similarly, the process needs to be open and easily accessible to members of the public. If wide spread support for restoration goals does not exist, the effort may not reach its full potential.

THE RESTORATION PLAN

The information that was compiled on the status and trends of habitat in the watershed or estuary should be combined with the analyses of priorities and restoration goals to create a restoration plan. A restoration plan sets a context for the goals, links the process to conservation and protection efforts, and provides groups undertaking restoration work with a clear view of what they are trying to accomplish. A restoration plan should be considered a "living document." For successful implementation, the plan should be reassessed regularly at a frequency determined by the pace at which change is occurring in the system. Progress toward the goals should be evaluated using metrics developed for the plan, measured on an ecosystem or regional scale. Factors to evaluate include whether restoration efforts are advancing the goals of the plan; whether the most important restoration needs are being met; and whether human and ecological needs are being balanced. Without an effective feedback process, the plan may become out of date and lose its focus.

SUMMARY OF PLANNING PROCESS

Evaluating a Watershed or Estuary
1. Evaluate current status of habitat
2. Describe causes and rates of decline in habitats
3. Identify services provided by habitat
4. Evaluate opportunities to restore habitats in the system

Establishing Restoration Priorities
1. Severity of need (scarceness of habitat/threat to habitat or species)
2. Ecological benefits provided by the habitat or species
3. Chances of successfully restoring the habitat or species
4. Public support for restoration of the habitat or species
5. Social and economic benefits provided by the habitat or species

Establishing a Plan for Restoration
1. Consider multiple stakeholder viewpoints
2. Establish an open and public process
3. Make a strong link to conservation and protection efforts
4. Document restoration goals—identify areas, habitats and species in the region for priority restoration and protection (identify how ongoing restoration programs and efforts can be linked together)
5. Revisit and revise the plan as needed after monitoring

PART II: FRAMEWORK FOR DEVELOPING RESTORATION PROJECTS

Restoration projects should be developed within the context of estuary or regional plans and priorities. This will help ensure that the project will improve estuarine or coastal health and produce broad cumulative benefits. The guidelines offered in this section are intended for project planners, managers and practitioners. Projects should follow the Principle of Estuarine Habitat Restoration and use the most efficient methods available to achieve restoration goals, quantify the success of restoration efforts and adapt projects as necessary during implementation. Project results and information also should be shared to help improve the effectiveness of future projects.

Developing Restoration Projects

1. Determine project goals
2. Determine and describe methods appropriate for the site and goals
3. Identify monitoring methods and success criteria
4. Implement the project and conduct monitoring
5. Use adaptive management
6. Share findings and lessons learned

DETERMINE THE PROJECT GOALS

The first step in planning a restoration project is to clearly state the goals of the project independently of the means that will be used to implement them. A goal should be site-specific, measurable and long-term. Ideally, a quantitative, measurable goal to achieve within a specified time frame would be provided. A vague, generic goal such as "improving ecosystem health" can mean many things and is difficult to evaluate.

Realistic goals should consider causes of decline and the current and potential future status of the habitat to be restored. Estuary or regional restoration plans can provide the background information needed to justify and describe quantitative project goals. "Creating and maintaining at least 25 acres of stable emergent wetlands at y cove in z bay by 2005" is a clear goal because it is measurable and site-specific. Goals that specify functions to be restored also provide clear direction for monitoring and documenting project success. For example, a project "to increase juvenile salmon presence in x bay to levels statistically similar to that of reference area y by year z" can be easily monitored to determine whether the goal is being met. Some references provide suggestions on setting project goals (Wilber et al., 1998; Thayer, 1992; Murphy, 1995; Weinstein et al., 1997; Japp, 1998).

DETERMINE AND DESCRIBE METHODS APPROPRIATE FOR THE SITE AND GOALS

Various methods of altering the environment should be considered to reach project goals. The relationship between habitat structure and function should be understood well enough to identify specific physical attributes that can be altered to produce the desired outcome. For example, if the goal is to achieve a certain acreage of emergent wetland, the substrate characteristics, site elevation, salinity ranges and other parameters necessary to produce stable vegetation must be known. Although restoration proposals used for similar habitat provide information on available technologies, they do not contain information useful to judge the success of the technique. Reviewing monitoring data from completed projects will provide useful information that can be incorporated into future projects to improve their potential success.

Project proposals should include detailed descriptions of the chosen methods. Once funding becomes available, a plan describing engineering designs and specifications should be developed. In addition to reviewing monitoring reports, other references are available that may be useful in selecting project methods (Thayer, 1992; Fonseca et al., 1998; Clarke et al., 1999; Kusler and Kentula, 1990; Koski, 1992; Matthews and Minello, 1994; Mitsch and Gosselink, 1986; Salmon et al., 1982; Schiel and Foster, 1992; Stauble and Hoel, 1986; Zedler, 1995; Zedler, 1996). A web-based guide to monitoring reports can be found at www.lacoast.gov/programs/cwppra/projects/proj-sum-basin.htm.

IDENTIFY MONITORING METHODS AND SUCCESS CRITERIA

Monitoring methods should be directly linked to project goals. The specific project goals will determine how complex the monitoring measurements should be. Monitoring may be as simple as using aerial photographs to quantify the acreage of mangrove swamp that exists before and five years after project implementation, or as complex as making hourly observations of water level and salinity to infer that the project reduces plant stress in the project area. Monitoring the quality and function of restored habitat can require a suite of biological measurements over many years.

Monitoring data should be used throughout the life of the project to guide project operations and maintenance. Quantitative performance standards for projects should include functional and structural elements and be linked to suitable, local reference habitats that represent "target conditions" where appropriate. It also may be useful to compare the project site to degraded, non-restored "control" sites to document improve-

ments in habitat condition. To be scientifically valid, reference and control sites should be as similar as possible to the areas to be restored. Project managers should plan for contingencies in the event that performance standards are not met within target time frames. For example, in seagrass restoration projects, it is common for 30 percent of the planted area to die within one year (Fonseca et al., 1998). This does not necessarily mean that the project is a failure or requires major modification. However, expectations for remedial planting and future monitoring of replanted areas should be included in project monitoring plans. Project plans also should address off-site considerations and include monitoring to ensure projects do not have negative impacts (for example, flooding) on nearby people and property.

Less intensive monitoring may be needed for projects that use techniques with a long history of success in the target environment. Similarly, less extensive monitoring may be required for projects that directly manipulate habitat than for those that indirectly manipulate habitat by altering ambient conditions. For example, if the project goal is to restore native vegetation and the method used is restoration of tidal exchange, variables associated with tidal exchange, such as salinity, should be measured in addition to mapping vegetation before and after project implementation. Likewise, if the project goal is to restore submerged aquatic vegetation and the method used is restoration of water clarity, variables associated with water clarity, such as algae and nutrients, should be measured in addition to mapping the vegetation before and after project implementation.

A few areas of the country have established guidance for monitoring restoration projects. For example, the state of New York produced guidelines for restoring and monitoring salt marsh (Niedowski, 2000). The Global Programme of Action Coalition for the Gulf of Maine produced regional standards to identify and evaluate tidal wetland restoration in the Gulf of Maine (Neckles and Dionne, 1999). Other references may be useful in selecting monitoring methods and success criteria (Albro et al., 1998; Aronson and Swanson, 1997; D'Avanzo, 1990; EPA, 1992; EPA, 1993; Fonseca et al., 1998; Lugo et al., 1999; DuBowy, 1997). A Web-based guide to monitoring reports can be found at www.lacoast.gov/programs/cwppra/projects/proj-sum-basin.htm. Monitoring guidelines for the Coastal Wetland Planning, Protection and Restoration Act Monitoring Program can be found at www.lacoast.gov/programs/cwppra/reports/monitoringplan/index.htm.

IMPLEMENT THE PROJECT AND CONDUCT MONITORING

Through proper design, construction, monitoring and adaptive

management, restoration projects can contribute to recovery of entire systems. Proper oversight of project implementation and monitoring includes actions to address permitting issues; selection of qualified contractors and oversight of field work including remedial planting; inspection of completed field work to ensure compliance with the plan; review and evaluation of monitoring reports; and alterations to the plan to ensure that it meets project goals. Sufficient funding should be available to carry out all phases of project implementation and monitoring.

USE ADAPTIVE MANAGEMENT

Adaptive management acknowledges that the environment is unpredictable and applies monitoring data to guide future project management and modifications. With adaptive management, the knowledge obtained through monitoring is translated into program redesign. Using adaptive management to allow for mid-course correction, as circumstances require, increases the possibility that goals of estuary or regional plans can be met. Monitoring results might dictate the redesign of the project, alteration of methods or adjustment of project goals if it becomes clear that the conditions at the site are not suitable to achieve the original project goals. Adaptive management does not represent project failure.

Adaptive management requires clear project goals, a conceptual model of the environment and a decision framework (Thom, 2000). The conceptual model includes parameters of both habitat structure and function, and evaluates how they are related to other performance and development characteristics. Performance criteria and monitoring data provide input to the decision process for actions to be taken to improve the outcome of the project (Thom, 1997). Other references provide information on the process and benefits of adaptive management (Weinstein et al., 1997; Haney and Power, 1996; Holling, 1978; McLain and Lee, 1996; Walters,1986).

SHARE FINDINGS AND LESSONS LEARNED

Monitoring data should be provided in a standard format that makes it easy to share with other planners and practitioners. Particularly if the methods used were new or innovative, providing sufficient documentation will allow them to be used by others. Transferring results of monitoring to coastal decision makers will build long-term support for habitat restoration as successes are documented. Information should be widely distributed in a form that allows evaluation of success at the watershed or estuary level.

Monitoring reports also should document any changes to the original construction specifications, including what problems were encountered, reasons for modifications and changes the

project staff would recommend with the knowledge they now possess.

PART III: IMPLEMENTING PLANS AND SELECTING PRIORITY PROJECTS

This section identifies issues to be considered in allocating limited restoration funds among the many worthy candidate projects. A strategic approach to restoration is required in order to ensure that projects that receive support are addressing the most important regional needs first. A regional approach should build on estuary restoration plans and identify those ecosystem goods and services that are of greatest importance to coastal communities, and where restoration is needed to improve the functions on which they rely. Proposed projects should clearly define the specific problem they seek to address within their estuary and region. Project plans also should contain clear goals, methods and evaluation techniques as specified in Part II of this chapter.

ESTABLISHING REGIONAL OR LARGER SCALE RESTORATION PRIORITIES

Once priorities are identified on the watershed or estuary scale (see Part I), watershed and estuary restoration planners should be brought together to identify priorities across a given region. The same issues evaluated on the scale of the estuary (needs, causes for decline, opportunities, values and services) should be discussed on this larger scale. Additional data and information may be required to conduct this evaluation.

Regional needs can be ranked according to the following factors:
1. severity of need (scarceness of habitat threat to species or habitat
2. ecological benefits provided by the habitat or species
3. chances of successfully restoring the habitat or species
4. public support for restoration of the habitat or species
5. social and economic benefits provided by the habitat or species

Restoration programs should be based on the broadest scale plans available. Publishing regional priorities will help restoration practitioners design the most useful projects. Following a large-scale restoration plan allows practitioners to build on existing programs and implement projects that address a variety of habitat problems, and thus provide a diverse array of ecosystem goods and services. Restoration programs should be closely coordinated with other programs that influence environmental quality in the estuary and the region. This will ensure that programs are not operating at cross-purposes. By

coordinating with other programs that provide funding for habitat protection and restoration, maximum results can be obtained with scarce funding. A resource that identifies project funding is Funding for Habitat Restoration Projects – A Citizen's Guide is available on-line at www.estuaries.org/funding.html.

MONITORING AND OUTREACH ON A LARGER SCALE

In addition to monitoring at the project level, progress in attaining the goals of restoration projects should be monitored over the largest appropriate scale. Restoration programs should consider establishing regional reference (unaltered "target" sites) and control areas (nonrestored or impacted sites) for important habitat types, and take advantage of remote sensing data for tracking habitat trends on larger levels. Monitoring on a watershed or regional scale can indicate whether regional restoration goals are being met by gauging the synergistic benefits of multiple projects. For example, wetland restoration efforts conducted in Louisiana under the Breaux Act are required to monitor the cumulative effects of all projects in restoring, enhancing and protecting the landscape (Steyer et al., in press). To address this concern, a system of multiple reference sites has been proposed to represent a spectrum of conditions found in the ecosystem. By sampling the reference sites over time, trajectories can be created for environmental parameters that can be compared to those at restored sites to evaluate progress (Steyer et al., in press). By establishing reference and control sites in an estuary with transects adjacent to permanent boardwalks, restoration researchers working throughout the estuary can gather comparison data to judge the effectiveness of restoration, while causing minimal disturbance to the habitat (DuBowy, 2000).

Restoration programs also should include program outreach and information transfer mechanisms to build long-term stewardship and public involvement. Using community volunteers and strategies to inform the public of project status and accomplishments will foster long-term support for restoration efforts.

CRITERIA AND CONSIDERATIONS FOR SELECTING PROJECTS FOR FUNDING

Selecting restoration projects for funding is an objective process to determine which projects will provide the greatest benefits. This section provides some considerations to assist with difficult funding decisions. Linking funding decisions to the restoration planning process will ensure that the goals of estuary or regional plans can be achieved.

Consistency with estuary or regional restoration plans and priorities

Projects that are components of a comprehensive regional or estuary-specific restoration plan should be given higher priority, and projects that address the highest priority habitat needs for the estuary or region should be funded first.

Long-term chance for success at meeting stated goals (technical quality and feasibility)

Three factors can be identified that contribute to the likelihood that a project will successfully meet its goals. The first is scientific merit, which can be ascertained through peer review from restoration scientists and practitioners. A project with scientific merit has a high potential to benefit habitat function using the proposed methods. The second factor is technical feasibility, which can be judged through review by restoration scientists and practitioners with appropriate expertise. The third factor influencing long-term success of a project is the potential for the project area to be destroyed or degraded in the future. This can be minimized if existing plans will protect the restored and surrounding habitat.

The following additional factors should be considered in evaluating long-term success at meeting project goals:
- soundness of project design and ecological approach;
- the conceptual approach;
- the technical and procedural feasibility of the proposed project;
- potential success of any innovative techniques;
- the project implementation potential and schedule;
- the proposed project's long-term potential for obtaining the targeted results;
- the expected length of time before success can be demonstrated;
- proposed methods to monitor and evaluate success of the project;
- proposed corrective actions;
- project management plans; and
- experience and qualifications of project personnel.

Benefits provided to the estuary or region as a whole

Projects that clearly demonstrate broad-scale and long-term benefits to estuarine function should receive priority. Examples of projects with broad benefit for the ecosystem would be those that are large in scope, that link currently discontinuous habitat or that address limitations that degraded habitat places on providing ecosystem goods and services to local communities and society as a whole.

Innovation

To advance the science of restoration, demonstration projects that make use of innovative restoration methods or technologies, or demonstrate new applications of existing techniques to make them more cost-effective, should be considered, provided that they have a reasonable chance of meeting the restoration objective.

Opportunities for partnerships and cost-sharing

Proposed projects should demonstrate a high potential for collaboration and cost-sharing with others, and should advance the goals of other restoration or coastal protection programs.

Local, public and state support

Project objectives should have strong local support. If the state has a dedicated source of funding to acquire or restore estuary habitat, natural areas and open spaces for the benefit of estuary habitat restoration or protection, projects may be more likely to receive long-term support and protection. Projects that also are consistent with coastal zone management plans to protect and manage coastal resources should receive priority.

Plans for outreach and public involvement

Proposed projects should demonstrate a high potential for public outreach and involvement. Project objectives, methods and results should be communicated to all interested parties.

Cost

Potential funding sources should be identified for all phases of work. The justification and allocation of the budget in terms of the work to be performed should be evaluated and compared to the direct benefits expected for estuarine habitat function. Proposals should demonstrate cost-benefit efficiency and potential for cost-effective implementation.

SUGGESTED APPLICATION OF PROJECT SELECTION CRITERIA

Step 1.

Project proposals should be prepared in accordance with the project guidance provided above. The project proposals should be evaluated for consistency with existing estuarine management plans for the area, technical feasibility and scientific soundness.

Projects that do not meet criteria set for these factors should be removed from consideration.

Step 2.

Individual projects that satisfy the first three criteria should then be scored according to the following project attributes:

1. The benefits the project provides to the estuary and the region, based upon regional assessments of the historic and current rates of habitat degradation, and the project proposal's demonstration of future benefits for natural resources and socio-economic services. The project should represent a restoration priority for the watershed, estuary and region.
2. The degree to which the approach encourages coordination among state, federal and private entities. This determination should be based not only on the partners contributing to or identified in the proposal, but also on proposed mechanisms for interaction throughout project implementation and monitoring.
3. The level of innovation shown in technological aspects of the project.
4. The project's expected success as gauged by the presence of programs that address pollution and other stresses that have historically degraded estuarine habitats of the type and in the area addressed by the project.
5. The ability to cover full project costs, including monitoring and adaptive management. The ability to meet requirements for matching funds should be considered.

Other factors such as state and local support and plans for including outreach and public involvement also should be considered.

Step 3.

Group projects according to six regions (see chapter four) and by estuary within each region.

Step 4.

The outcome of the scoring process should be a ranked list of projects that all meet the minimum criteria for technical feasibility and scientific soundness and are consistent with existing planning efforts. A separate list should be prepared for each estuary and region. Highly ranked projects should be further screened to ensure they are cost-effective (relative to previous projects of similar type and scope within the region). This selection factor should not be applied in the scoring process in the same way as other factors because of the wide range of costs and the variable nature of the benefits associated with estuarine habitat restoration. Projects should be selected based on these rankings, funds available and any special opportunities or issues considered of overriding importance.

CONCLUSION AND REVIEW OF FRAMEWORK

Using a framework for planning and prioritizing habitat restoration projects will allow us to increase the effectiveness of our restoration efforts. Creating watershed or estuary

restoration plans identifies priority habitat types or areas to be restored. Projects can then be designed that have the greatest chance of successfully restoring these habitats and areas. Finally, implementing a process of establishing priorities among estuaries or regions, and evaluating projects for their chances of success, will improve habitat restoration efforts on a national scale.

SUMMARY OF FRAMEWORK FOR RESTORATION PLANNING AND PRIORITY-SETTING

Watershed or Estuary Planning

❖ Evaluate the watershed or estuary for the current status of the habitats; the ecological, social and economic benefits they provide; causes and rates of decline; and opportunities to restore habitat.

❖ Rank needs within the watershed or estuary according to severity of loss, benefits and services provided, opportunities for successful restoration and public support.

❖ Establish and document restoration goals and priorities in a restoration plan. Use an open and public process and link to habitat conservation efforts. Revise the goals and the plan as needed.

Developing Restoration Projects

❖ Through proper design, construction, monitoring and adaptive management, restoration projects can contribute to the restoration of the overall ecosystem.

❖ Project development includes determining project goals, determining appropriate methods, selecting monitoring methods and success criteria, implementing the project and monitoring its success, conducting adaptive management to allow for mid-course correction, and sharing project information with others.

Selecting Priority Projects

❖ Consider needs across a regional scale to allow for distribution of limited resources.

❖ Rank needs across the region according to severity of need, ecological benefits provided by the habitat, social and economic services provided, chances of successfully restoring the habitat and public support for restoring the habitat.

❖ Evaluate projects for consistency with plans, technical quality and feasibility, benefits provided, time until restoration is successful, innovation, opportunities for partnership, public and state support, plans to include outreach and public involvement, and cost.

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